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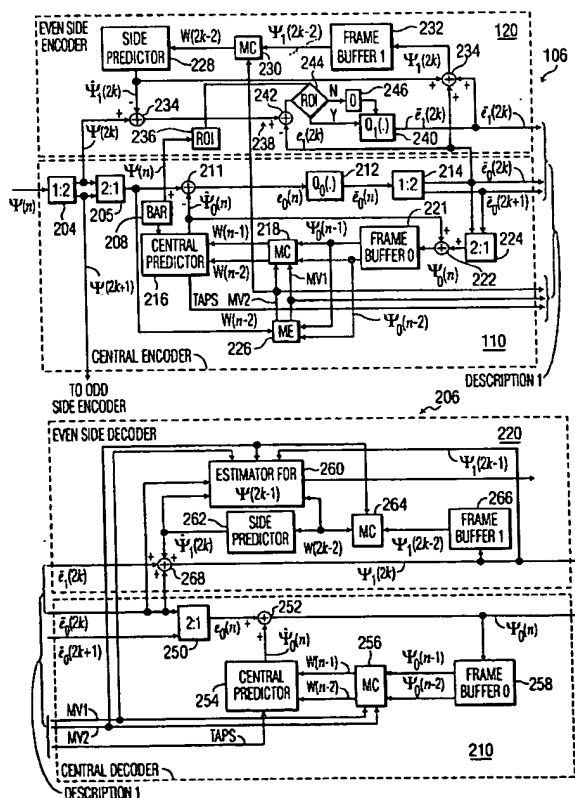
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[Continued on next page]

(54) Title: **CONTENT-ADAPTIVE MULTIPLE DESCRIPTION MOTION COMPENSATION FOR IMPROVED EFFICIENCY AND ERROR RESILIENCE**



(57) Abstract: A multiple description coding method is applied to video, and optimized to preclude transmission to the decoder of mismatch correction information that applies to portions of a frame outside a region of interest. Additional bit efficiency is realized by selectively updating, based on video content, the weighting of prediction frames motion compensated from corresponding frames used in estimating a current frame. Frequency of update is adaptively determined based on the realized increased accuracy of prediction and concomitant residual image bit savings as compared, in tradeoff, with the need to more frequently transmit the updated weights to the receiver.



European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Inter. Application No
PCT/IB 03/03952

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/26 H04N7/64 H04N7/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WANG Y ET AL: "ERROR-RESILIENT VIDEO CODING USING MULTIPLE DESCRIPTION MOTION COMPENSATION" IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY, IEEE INC. NEW YORK, US, vol. 12, no. 6, June 2002 (2002-06), pages 438-452, XP001114974 ISSN: 1051-8215 the whole document	1-5, 10-15, 19,20
Y	US 5 347 311 A (GOLIN STUART J) 13 September 1994 (1994-09-13) column 2, line 46 - column 4, line 4 -/--	1-5, 10-15, 19,20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

14 November 2003

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15. 03. 2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 03/03952

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 088 061 A (ITO NORIO ET AL) 11 July 2000 (2000-07-11) column 9, line 36 - column 11, line 15 -----	1-5, 10-15, 19,20
A	YAO WANG ET AL: "Error resilient video coding using multiple description motion compensation" CONFERENCE PROCEEDINGS ARTICLE, 3 October 2001 (2001-10-03), pages 441-446, XP010565813 cited in the application the whole document -----	1-5, 10-15, 19,20
A	REGUNATHAN S L ET AL: "Efficient prediction in multiple description video coding" IEEE - CONFERENCE PROCEEDINGS ARTICLE, vol. 1, 10 September 2000 (2000-09-10), pages 1020-1023, XP010530791 the whole document -----	1-5, 10-15, 19,20
A	SHIRANI S: "ERROR RESILIENT IMAGE COMMUNICATION USING CONTENT-BASED MULTIPLE DESCRIPTION CODING" PROCEEDINGS INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY: CODING AND COMPUTING, XX, XX, 8 April 2002 (2002-04-08), pages 106-110, XP001104510 the whole document -----	1-5, 10-15, 19,20
A	US 2002/122491 A1 (KURCEREN RAGIP ET AL) 5 September 2002 (2002-09-05) the whole document -----	1-5, 10-15, 19,20
A	US 2002/006161 A1 (RADHA HAYDER ET AL) 17 January 2002 (2002-01-17) paragraph [0022] -----	1-5, 10-15, 19,20
A	US 5 764 803 A (JACQUIN ARNAUD ERIC ET AL) 9 June 1998 (1998-06-09) abstract -----	1-5, 10-15, 19,20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 03/03952

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-5, 10-15, 19-20

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5, 10-15, 19, 20

A multiple description video encoding method using a identification of a region of interest (ROI) and the precluding from the transmission of the portion of the mismatch signal being outside the ROI.

2. claims: 6-9, 16-18, 21

A multiple description video encoding method wherein the central prediction is formed using a weighted average of motion compensated frames, said weighted average being adaptive to the content of the video sequence.

INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/IB 03/03952

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